Ecological Effects Branch Review

1. Chemical: Butoxyethyl triclopyr

2. Test Material: Technical - 96.4% a.i., A liquid

3. Study Type: Acute Toxicity, Freshwater Invertebrates

4. Study Identification: Milazzo, D.P. Batcherder, T.L. (1981) Environmental Screening of Chemicals: Garlon 4 Triclopyr EB Ester. Environmental Sciences Research Laboratory. Submitted by DowElanco, Midland, Michigan. ~~TRID # 470060-032~~ MRID 151965

5. Reviewed By:

   Jeffrey Bigler
   Fishery Biologist
   Ecological Effects Branch
   Environmental Fate and Effects Division (H7507C)

   Signature:
   Date: 3/14/91

   Approved By:

   Mike Rexrode
   Acting Head, Section 3
   Ecological Effects Branch
   Environmental Fate and Effects Division (H7507C)

   Signature: Michael Rexrode
   Date: 3/14/91

6. Conclusions: This study meets minimum guideline requirements for a Freshwater Invertebrate Toxicity Study and may be used to support reregistration of Garlon 4 Triclopyr EB Ester. An LC_{50} value of 12.0 mg/l (95% CI= 4-32 mg/l) indicates Garlon 4 may be characterized as slightly toxic to freshwater invertebrates.

7. Recommendations: N/A

8. Background: Submitted in response to Reregistration requirements.

9. Discussion of Individual Results: N/A

10. Materials and Methods:

A. Test Animals: Laboratory reared Daphnia magna, all first instar at test initiation, were used for the definitive study. The daphnids were not fed during the study.

B. Dose: A dilution water control, solvent control (0.1 ml acetone/200 ml dilution water), and nominal test doses of 150.0, 90.0, 54.0, 32.4, 19.4, 11.6, 6.9, 4.2, 2.51, 1.51, .907, .54, and .326 mg/l.

C. Test System: The static exposure system consisted of fifteen sets of 3 replicate beaker test chambers. Test solution was maintained at 20° ±1°C.

D. Design: Thirty Daphnia magna were tested per treatment level; ten daphnids per replicate; three replicates per treatment level. Observations for mortality and sublethal effects were recorded every 24 hours.

E. Statistics: The nominal measured concentrations and the corresponding mortality data were used to determine the LC_{50} using Stephans' computer program.

11. Reported Results:

The dissolved oxygen concentration ranged from 8.6 - 9.5 mg/l, the pH was 8.3 - 8.5, and the temperature was maintained at 20° ±1°C throughout the test period. Water hardness as $CaCO_3$ was approximately 100 mg/l. Mortality of 10 daphnids or greater occurred at the test concentrations 6.9 mg/l and higher with 90% mortality occurring at the highest level (150 mg/l) tested.

12. Study Authors' Conclusions/QA Measures:

The LC_{50} calculated by the author for the definitive test was 15.9 mg/l with 95% confidence intervals of 12.5 - 20.4 mg/l. The highest concentration with 1 or less mortalities was 1.51 mg/l (zero mortality).

13. Reviewers' Discussion and Interpretation of the Study:

A. Test Procedures: The test procedures were generally in accordance with accepted guidelines with only minor deviations noted.

B. Statistical Analysis: Based on results of this study and the use of the Stephans stat program, the Ecological Effects Branch has estimated an LC_{50} value of 12 mg/l with 95% confidence limits of 4-32 mg/l.

C. Discussion and Results: The test is acceptable and may be used for fulfilling EPA requirements for an Acute Toxicity Study testing daphnid exposure to the technical product.

D. Adequacy of Study:

Classification - Core.

Rational - N/A.

Repairability - N/A.

5. Completion of One-liner: Yes.

NOTE: THERE WAS CONTROL MORTALITY, BUT AT LEAST ONE
OF THE LOWER CONCENTRATIONS HAD ZERO MORTALITY.
THEREFORE, ABBOTT'S CORRECTION IS NOT APPLICABLE.

bigler GARLON4 DAPHNIA MAGNA ENTER YOUR NAME. BIGLER

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
150	30	27	90	4.215167E-04
90	30	25	83.33333	1.624572E-02
54	30	24	80	7.154533E-02
32	30	23	76.66666	.261144
19	30	20	66.66667	4.936858
11	30	14	46.66667	42.77678
7	30	10	33.33334	4.936858
4	30	2	6.666667	4.339964E-05
3	30	2	6.666667	4.339964E-05
2	30	0	0	9.313227E-08
1	30	1	3.333334	2.8871E-06
.5	30	0	0	9.313227E-08
.3	30	1	3.333334	2.8871E-06

THE BINOMIAL TEST SHOWS THAT 4 AND 32 CAN BE
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 12.03322

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
9	4.058664E-02	16.88828	13.60337	.18361

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	.0724494	1.977059	2.640295E-02

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED
USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 1.613857
95 PERCENT CONFIDENCE LIMITS = 1.179464 AND 2.048249

LC50 = 16.0531
95 PERCENT CONFIDENCE LIMITS = 11.09175 AND 23.96221

LC10 = 2.621948
95 PERCENT CONFIDENCE LIMITS = 1.263755 AND 4.227292

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